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On 2/28/01

TOWNSEND and TOWNSEND and CREW LLP

By: Sandy Lai

PATENT
Attorney Docket No.: 18564-003610US

#7 Petition Fowarded 5-4-01

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Steven A. Sunshine *et al.*

Application No.: 09/596,169

Filed: June 16, 2000

For: MULTIPLE SENSING SYSTEM AND DEVICE

Examiner: C. Tsai

Art Unit: 2857

PETITION TO MAKE SPECIAL UNDER 37 C.F.R. § 1.102 (d)

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Applicants hereby respectfully petition to make special the above-referenced patent application, as an invention according to M.P.E.P. § 708.02(VIII), so that examination of the application may be advanced. Please charge $130.00, pursuant to 37 C.F.R. § 1.17(i), to Deposit Account 20-1430. Please charge any additional fees or credit overpayment to the above Deposit Account. This petition is submitted in triplicate.

REMARKS

Claims 1-22 are pending in this application and presented for examination. The claims are set forth in the Appendix for the Examiner's convenience. Petitioners respectfully request early action on the merits.

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Applicants hereby respectfully petition to make special the above-referenced patent application, as an invention according to M.P.E.P. § 708.02 (VIII). Under M.P.E.P. § 708.02 (VIII), a new application may be granted special status provided Applicants comply with each of the following items:

(A) Submits a petition to make special accompanied by the fee set forth in 37 CFR 1.17(i);

(B) Presents all claims directed to a single invention, or if the Office determines that all the claims presented are not obviously directed to a single invention, will make an election without traverse as a prerequisite to the grant of special status.

(C) Submits a statement(s) that a pre-examination search was made, listing the field of search by class and subclass, publication, Chemical Abstracts, foreign patents, etc. A search made by a foreign patent office satisfies this requirement;

(D) Submits one copy each of the references deemed most closely related to the subject matter encompassed by the claims if said references are not already of record; and

(E) Submits a detailed discussion of the references, which discussion points out, with the particularity required by 37 CFR 1.111 (b) and (c), how the claimed subject matter is patentable over the references.

With respect to item (A), Applicants respectfully submit herewith a petition to make special accompanied by the fee set forth in 37 CFR 1.17(i).

With respect to item (B), Applicants present herewith claims 1-22 directed to a single invention. Applicants believe all claims pending are directed to a single invention. However, if the U.S.P.T.O. determines that the claims presented are not directed to a single invention, Applicants acknowledge that an election without traverse will be made though the established telephone restriction practice.

With respect to item (C), Applicants submit that a pre-examination search was made at the U.S.P.T.O. for the corresponding international application PCT/US00/16738. A copy of the search report is enclosed herewith, and is of record in the application. The PCT Search Report lists the field of search by class and subclass (both Internationally and U.S.). Moreover, according to the Search Report, the STN and CAS electronic databases were also

consulted. Applicants make no admissions regarding the materiality of the references or whether the references are prior art with respect to the present invention.

With respect to item (D), the submission of one copy each of the references deemed most closely related to the subject matter encompassed by the claims are already of record. A Supplemental Information Disclosure Statement was submitted to the U.S.P.T.O on December 8, 2000. Thus, the references are already of record.

With respect to item (E), Applicants submit herewith a detailed discussion of the references, which discussion points out, with the particularity required by 37 CFR 1.111 (b) and (c), how the claimed subject matter is novel and unobvious over the references.

THE PRESENT INVENTION

The present invention provides a distributed sensing system in a networked environment for identifying an analyte of interest, including a first sensor array connected to the network comprising sensors capable of producing a first response in the presence of a chemical stimulus; a second sensor array connected to the network comprising sensors capable of producing a second response in the presence of a physical stimulus; and a local or remote computer comprising a resident algorithm with data processing, data comparison, and judgment making capability. In a preferred embodiment, the algorithm indicates or selects the most relevant sensor in the network to identify the analyte. The sensors in the two arrays can be separated over large spatial areas, wherein the sensor arrays are networked together across the environment being monitored for analyte presence and identity. Suitable networks include a computer local area network (LAN), an intranet or the Internet (www).

The present invention claims priority to U.S. Provisional Application Serial No. 60/139,842, filed June 17, 1999, and U.S. Patent Application Serial No. 09/518,179, filed March 2, 2000. Formal drawings were submitted when the application was originally filed.

DETAILED DISCUSSION OF REFERENCES

References cited in the PCT Search Report:

1. **U.S. Patent No. 6,061,753**
2. **U.S. Patent No. 6,052,737**

3. **U.S. Patent No. 4,670,405**
4. **U.S. Patent No. 5,469,369**
5. **U.S. Patent No. 5,025,653**
6. **U.S. Patent No. 4,779,451**
7. **U.S. Patent No. 5,801,297**
8. **U.S. Patent No. 5,959,191**
9. **U.S. Patent No. 5,675,070**
10. **U.S. Patent No. 5,541,851**

1. U.S. Patent No. 6,061,753

U.S. Patent No. 6,061,753 ("Ericson") describes a method, apparatus, and computer program product for controlling access to a target device that utilizes an initiator bus identifier to either permit or deny access to a selected portion of a target device. To that end, a message having an initiator identifier identifying the initiator is directed from the initiator device to the target device to request access to the selected portion of the target device. Upon receipt by the target device, it is determined if the initiator identifier is in a permitted set of initiator identifiers associated with the selected portion of the target device. (Column 2, lines 18-26). The target device can be for example, a redundant array of independent disks i.e. a RAID. (Column 4, lines 4-8).

Ericson teaches solving privacy problems by assigning sets of logical units to selected initiators. Ericson also enables a target with many logical units to be more efficiently utilized. For example, a target having thirty-two logical units and located on a narrow SCSI bus system may be fully utilized by four initiators that each has eight different assigned logical units. (Column 7, lines 9-16).

Ericson does not teach or suggest a distributed sensing system in a networked environment for identifying an analyte of interest. There is no suggestion of a first sensor array connected to the network comprising sensors capable of producing a first response in the presence of a chemical stimulus; a second sensor array connected to the network comprising sensors capable of producing a second response in the presence of a physical stimulus; and a local or remote computer comprising a resident algorithm with data processing, data

comparison, and judgment making capability. Therefore, the present invention is novel and unobvious over Ericson.

2. U.S. Patent No. 6,052,737

U.S. Patent No. 6,052,737 ("Bitton *et al.*") teach a computer system, program product and method that enhances the operation of a communications protocol by monitoring timers associated with the protocol to determine the transmission requirements placed on a transmit queue. The number of frames to be enqueued at a particular system tick is dynamically modified to prevent queue overload. (Abstract). Various protocol timers associated with respective links in a network using an IEEE 802.2 protocol are monitored to determine their expiration times and thus to determine the frame transmission requirements to be placed on the system, and particularly on the transmit queue. (Column 3, lines 19-24). By dynamically monitoring the timer expiration, the number of frames to be enqueued within a transmit queue is dynamically modified to prevent an overload of the queue and thus prevent frames from being undesirably dropped. In that way, the communication path between the links can be maintained to avoid any lost links within the network. Furthermore, the capacity of the network is increased such that it will be able to handle a larger number of links and respective users for a device within the network. (Column 3, lines 24-34).

Bitton *et al.* do not teach or suggest a distributed sensing system in a networked environment for identifying an analyte of interest. There is no suggestion of a first sensor array connected to the network comprising sensors capable of producing a first response in the presence of a chemical stimulus; a second sensor array connected to the network comprising sensors capable of producing a second response in the presence of a physical stimulus; and a local or remote computer comprising a resident algorithm with data processing, data comparison, and judgment making capability. Therefore, the present invention is novel and unobvious over Bitton *et al.*

3. U.S. Patent No. 4,670,405

U.S. Patent No. 4,670,405 ("Stetter *et al.*") describes a portable instrument for use in the field in detecting and identifying a hazardous component in air or other gas including

an array of small sensors which upon exposure to the gas from a pattern of electrical responses, a source of standard response patterns characteristic of various components, and microprocessor means for comparing the sensor-formed response pattern with one or more standard patterns to thereby identify the component on a display. (Abstract).

Stetter *et al.* teach an analytical device for identifying a component in a gas such as air through the use of an array of small, preferably tiny sensors such as existing electrochemical, semiconductor, heated noble metal catalyst, or photoionization sensors, it has been found that the pattern of responses from these sensors provides identification of the component when compared to a standard response pattern which may be established for the component in the memory of the device. In the device, at least two of the sensors produce different electrical responses from the chemical interaction of the component or its derivative with each sensor.

Stetter *et al.* do not teach or suggest a distributed sensing system in a networked environment for identifying an analyte of interest. There is no suggestion of a first sensor array connected to the network comprising sensors capable of producing a first response in the presence of a chemical stimulus; a second sensor array connected to the network comprising sensors capable of producing a second response in the presence of a physical stimulus; and a local or remote computer comprising a resident algorithm with data processing, data comparison, and judgment making capability. Therefore, the present invention is novel and unobvious over Stetter *et al.*

4. U.S. Patent No. 5,469,369

U.S. Patent No. 5,469,369 ("Rose-Pehrsson *et al.*") describes a method and a system using that method which employ a pattern recognition algorithm to improve sensitivity in detecting hazardous vapors. The algorithm enables the discrimination of vapors of interest from non-hazardous substances at higher concentrations in varying relative humidity. (Abstract).

Rose-Pehrsson *et al.* teach a method and system which enables vapors of interest, such as chemical warfare agents, to be discriminated from other vapors or substances, i.e., non-hazardous substances, at higher concentration in varying relative humidity. (Column

2, lines 46-49). Rose-Pehrsson *et al.* teach a sensor array in columns 8, lines 35-67 bridging to columns 9-12.

There is no teaching or suggestion of distributed sensing system in a networked environment for identifying an analyte of interest. Moreover, there is no suggestion of a first sensor array connected to the network comprising sensors capable of producing a first response in the presence of a chemical stimulus; a second sensor array connected to the network comprising sensors capable of producing a second response in the presence of a physical stimulus as is presently claimed. Therefore, the present invention is novel and unobvious over Rose-Pehrsson *et al.*

5. U.S. Patent No. 5,025,653

U.S. Patent No. 5,025,653 ("Schuldt") describes a gas detection system for detecting the content of inflammable, explosive and/or toxic or other gases an arrangement is proposed according to which a central electronic evaluation system is connected to a plurality of measuring heads, which are installed at the points of measurement, by a single common two-wire line and each measuring head is provided, at its place of installation, with its own intelligence (microprocessor) for processing at least partly the values supplied by the sensor, each measuring head being equipped with at least two sensors of different types or measuring ranges and with an additional temperature sensor and each sensor having an identification which is indicative of the type and measuring range of the sensor and which is picked up by the measuring head. The electronic evaluation system and the measuring heads communicate with each other by bidirectional digital communication, after the measuring heads have been addressed, and the measuring head is supplied with current via the two-wire line. (Abstract)

Schuldt teach at column 5, lines 43-59:

> Each of the measuring heads 12a to 12i comprises a separate microprocessor and may be equipped with a plurality, in the illustrated embodiment with two, of sensors having the most different functions for gas analysis purposes. In the particular embodiment illustrated in the drawing the sensors are designed to detect only toxic, explosive, or oxygen mixtures, as indicated at the measuring heads, although it would of course be possible also in the illustrated case, where each head is equipped with two sensors, to implement any desired combination, for example one sensor for toxic and one sensor for

> explosive gas, or two sensors for toxic gas mixtures of different components, or a combination of one oxygen sensor with one sensor for toxic or explosive gas mixtures, and in addition it would also be possible to employ a plurality of sensors for detecting one and the same gas, but for different measuring ranges.

Although Schuldt teach more than two sensor arrays, Schuldt do not teach a first sensor array connected to the network comprising sensors capable of producing a first response in the presence of a chemical stimulus and a second sensor array connected to the network comprising sensors capable of producing a second response in the presence of a physical stimulus as presently claimed. Therefore, the present invention is novel and unobvious over Schuldt.

6. U.S. Patent No. 4,779,451

U.S. Patent No. 4,779,451 ("Ezawa *et al.*") describes a system for measuring a foreign material in a liquid, includes a sampling section, vacuum deaerators and foreign material measuring sensors. The sampling section prepares a sample liquid containing various foreign materials having particles of different sizes and numbers and a calibration standard liquid containing particles of known sizes and numbers. The vacuum deaerators deaerate gases mixed in the sample and calibration standard liquids. The sensors detect the foreign materials in the deaerated liquids. These sensors are arranged in front of the deaerators.

Ezawa *et al.* do not teach or suggest a distributed sensing system in a networked environment for identifying an analyte of interest. There is no suggestion of a first sensor array connected to the network comprising sensors capable of producing a first response in the presence of a chemical stimulus; a second sensor array connected to the network comprising sensors capable of producing a second response in the presence of a physical stimulus; and a local or remote computer comprising a resident algorithm with data processing, data comparison, and judgment making capability. Therefore, the present invention is novel and unobvious over Ezawa *et al.*

7. U.S. Patent No. 5,801,297

U.S. Patent No. 5,801,297 ("Mifsud *et al.*") describes a device for carrying out a method of odor detection comprising, in particular, a plurality of chambers each including a plurality of semi-conductor gas sensors conductive polymer gas sensors surface acoustic wave gas sensors as detection means, a variable flow gas pump for forming a gas flow in said chambers measurement electronic device for operating the detection means a data processing unit for recording in a file the olfactory prints obtained using the detection means, and for comparing the detected impressions with those in the file so that odors may be identified

Mifsud *et al.* do not teach or suggest a distributed sensing system in a networked environment for identifying an analyte of interest. There is no suggestion of a first sensor array connected to the network comprising sensors capable of producing a first response in the presence of a chemical stimulus; a second sensor array connected to the network comprising sensors capable of producing a second response in the presence of a physical stimulus; and a local or remote computer comprising a resident algorithm with data processing, data comparison, and judgment making capability. Therefore, the present invention is novel and unobvious over Misfud *et al.*

8. U.S. Patent No. 5,959,191

U.S. Patent No. 5,959,191 ("Lewis *et al.*") describes chemical sensors for detecting analytes in fluids comprise first and second conductive elements electrically coupled to and separated by a chemically sensitive resistor which provides an electrical path between the conductive elements. The resistor comprises a plurality of alternating nonconductive regions and conductive regions transverse to the electrical path. Arrays of such sensors are constructed with at least two sensors having different chemically sensitive resistors providing dissimilar such differences in resistance. Variability in chemical sensitivity from sensor to sensor is provided by qualitatively or quantitatively varying the composition of the conductive and/or nonconductive regions. An electronic nose for detecting an analyte in a fluid may be constructed by using such arrays in conjunction with an electrical measuring device electrically connected to the conductive elements of each sensor. (Abstract).

Lewis *et al.* do not teach or suggest a distributed sensing system in a networked environment for identifying an analyte of interest. There is no suggestion of a first sensor

array connected to the network comprising sensors capable of producing a first response in the presence of a chemical stimulus; a second sensor array connected to the network comprising sensors capable of producing a second response in the presence of a physical stimulus; and a local or remote computer comprising a resident algorithm with data processing, data comparison, and judgment making capability. Therefore, the present invention is novel and unobvious over Lewis *et al.*

9. U.S. Patent No. 5,675,070

U.S. Patent No. 5,675,070 ("Gelperin") describes an artificial olfactory system and method for identifying an object by its aroma. The artificial nose includes a testing chamber in which is disposed an array of gas sensors. The object to be identified is placed in close proximity to the testing chamber. The air pressure within the testing chamber is then lowered below ambient, thereby causing ambient air to flow past the object being identified and into the testing chamber. As air flows past the object being identified, the aroma of the object becomes mixed with the air and is carried into the testing chamber. Once within the testing chamber, the aroma/air mixture is exposed to the array of gas sensors. The gas sensors detect the levels of various gases comprising the aroma/air mixture and produce a sensor pattern capable of being identified using pattern recognition techniques.

Gelperin does not teach or suggest a distributed sensing system in a networked environment for identifying an analyte of interest. Rather, Gelperin teach a testing chamber in which is disposed an array of gas sensors. The sensing system of Gelperin is designed for a grocery checkout stand and is self-contained. The present invention is novel and unobvious over Gelperin.

10. U.S. Patent No. 5,541,851

U.S. Patent No. 5,541,851 ("Sato *et al.*") describes a method for discriminating a chemical/physical quantity comprises exposing a sensor array consisting of a plurality of sensor members exhibiting differing response ranges with respect to a chemical/physical quantity to stimulation and discriminating the cause of the stimulation from the order in which the sensor members produce lowest significant output levels.

As set forth in column 3, 29-34 and Figure 1:

The apparatus 10 consists of two major sections: a sensor array 11 disposed in a measurement space (or *measurement vessel*) 20 in which the chemical/physical quantity to be evaluated is present and a discrimination circuit 30 for processing the signals output by the sensor array 11.

Further:

Column 9, lines 31-40 and Figure 1:
It is also preferable for the sensing surfaces of all n number of sensor S1-Sn to be exposed to the stimulation simultaneously and uniformly. For achieving this, the volume of the measurement space or measurement vessel 20 should be made small and the sensor members should be disposed in close proximity. Especially in the case of a chemical stimulation, it is advisable to provide a *fan or stirrer* 18 (FIG. 1) or like active agitation means in the measurement space or measurement vessel 20 and to use this means to conduct forced stirring.

Thus, Sato *et al.* do not teach or suggest a distributed sensing system in a networked environment for identifying an analyte of interest having a first sensor array connected to a network comprising sensors capable of producing a first response in the presence of a chemical stimulus; and a second sensor array connected to the network comprising sensors capable of producing a second response in the presence of a physical stimulus. Thus, the distributed sensing system of the present invention is novel and unobvious over Sato *et al.*

CONCLUSION

In view of the foregoing remarks, Applicants believe all the requirements for petition to make special under 37 C.F.R § 1.102(d) and M.P.E.P. § 708.02 (VIII) have been met. Moreover, Applicants believe that the present invention is novel and unobvious over the art of record. As such, Applicants respectfully request that the present petition be granted and examination on the merits of the subject application be conducted forthwith.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 925-472-5002.

Respectfully submitted,

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Appendix

1. A distributed sensing system in a networked environment for identifying an analyte, said system comprising:

a first sensor array connected to said network comprising sensors capable of producing a first response in the presence of a chemical stimulus;

a second sensor array connected to said network comprising sensors capable of producing a second response in the presence of a physical stimulus; and

a computer connected to said network having an algorithm wherein said first response and said second response are processed to identify said analyte.

2. The system according to claim **1**, wherein said algorithm selects the most relevant sensor modality in said first and said second array to identify said analyte.

3. The system according to claim **1**, wherein each sensor of said first sensor array is a member selected from the group consisting of a bulk conducting polymer film, a semiconducting polymer sensor, a surface acoustic wave device, a fiber optic micromirror, a quartz crystal microbalance, a conducting/nonconducting regions sensor, a dye impregnated polymeric coatings on optical fiber and combinations thereof.

4. The system according to claim **1**, wherein each sensor of said second sensor array is a member selected from the group consisting of an optical sensor, a mechanical sensor, a radiation sensor, a thermal sensor and combinations thereof.

5. The system according to claim **3**, wherein each sensor of said first sensor array is a conducting/nonconducting regions sensor.

6. The system according to claim **4**, wherein each sensor of said second sensor array is an optical sensor, a mechanical sensor, a radiation sensor, a thermal sensor and combinations thereof.

7. The system according to claim **1**, wherein the transmission of said first response is conducted via wired communications.

8. The system according to claim **1**, wherein the transmission of said first response is conducted via wireless communications.

9. The system according to claim **8**, wherein said wireless communications are implemented using communications technologies selected from a member of a group consisting of infrared technology, satellite technology, microwave technology and radio wave technology.

10. The system according to claim **1**, wherein said networked environment is a member selected from the group consisting of a worldwide computer network, an internet, the Internet, a wide area network, a local area network, an intranet and combinations thereof.

11. The system according to claim **1**, wherein said networked environment is the Internet.

12. A device for monitoring an analyte in an environment, said device comprising:

at least one sensor array, wherein said at least one sensor array comprises at least two sensors capable of producing a first response in the presence of a chemical stimulus;

a second sensor which is capable of producing a second response in the presence of a physical stimulus;

a connector that connects said at least one sensor array and said second sensor to a central processing unit, said central processing unit collects and stores said first and second responses; and

an analyzer configured to analyze a plurality of responses wherein said analyzer monitors said analyte in said environment.

13. The device according to claim **12**, wherein said second sensor is an array of sensors.

14. The device according to claim **12**, wherein said device is a handheld device.

15. The device according to claim **12**, wherein each of said at least two sensors is a member selected from the group consisting of a bulk conducting polymer film, a semiconducting polymer sensor, a surface acoustic wave device, a fiber optic micromirror, a quartz crystal microbalance, a conducting/nonconducting regions sensor, a dye impregnated polymeric coatings on optical fiber and combinations thereof.

16. The device according to claim **15**, wherein each of said at least two sensors is a conducting/nonconducting regions sensor.

17. The device according to claim **13**, wherein each sensor in said second sensor array is a member selected from the group consisting of an optical sensor, a mechanical sensor, a radiation sensor, a thermal sensor and combinations thereof.

18. The device according to claim **14**, wherein said handheld device further comprises a communication interface coupled to the processing device and configured to communicate with a computer network.

19. A method for transferring a combination of chemical and physical data over a computer network for identification of an analyte, said method comprising:

transmitting sensory data from a first sensor array comprising sensors capable of producing a first response in the presence of a chemical stimulus to a remote location;

transmitting physical data from a second sensor array comprising sensors capable of producing a second response in the presence of a physical stimulus to a remote location; and

processing said sensory and physical data at said remote location for identification of an analyte.

20. The method according to claim **19**, further comprising employing a sensor selection algorithm to determine sensors in said first array.

21. The method according to claim **19**, wherein each sensor of said first sensor array is a member selected from the group consisting of a bulk conducting polymer film, a semiconducting polymer sensor, a surface acoustic wave device, a fiber optic

micromirror, a quartz crystal microbalance, a conducting/nonconducting regions sensor, a dye impregnated polymeric coatings on optical fiber and combinations thereof.

22. The method according to claim **19**, wherein each sensor of said second sensor array is a member selected from the group consisting of an optical sensor, a mechanical sensor, a radiation sensor, a thermal sensor and combinations thereof.